WE CLAIM AS OUR INVENTION:

1. A method for forming fluorescent layers on a substrate, comprising the steps of:

vapor depositing a needle-shaped fluorescent layer, composed of fluorescent material, on a substrate; and

controlling vapor deposition of said fluorescent layer so that said fluorescent layer is deposited on said substrate with a density which is reduced in comparison to a density which said fluorescent material has as a solid, to produce a needle-shaped fluorescent layer with optical separation between needle structures.

2. A method as claimed in claim 1 comprising controlling said vapor deposition to reduce said density of the fluorescent layer between 5% to 50% of said density that said fluorescent material has as a solid.

3. A method as claimed in claim 1 wherein the step of vapor depositing said fluorescent layer comprises producing a vapor jet of said fluorescent material directed onto said substrate, and cooling said vapor jet before said vapor jet before said vapor jet strikes said substrate.

4. A method as claimed in claim 3 wherein said vapor jet is produced in a vapor-deposition apparatus, and comprising cooling said vapor jet by conducting cool inert gas through said vapor-deposition apparatus.

5. A method as claimed in claim 3 wherein said vapor jet is produced in a vapor-deposition apparatus, and comprising introducing said inert gas into said vapor deposition apparatus at a gas pressure below 10 Pa.

6. A method as claimed in claim 5 comprising introducing said inert gas into said vapor-deposition apparatus at a pressure between 1 Pa and 3 Pa.

7. A method as claimed in claim 4 comprising diverting said inert gas with a baffle before introducing said inert gas into said vapor jet.

8. A method as claimed in claim 4 comprising discharging said inert gas from said vapor-deposition apparatus with a pump.

9. A method as claimed in claim 4 comprising introducing said inert gas into said vapor-deposition apparatus through a control valve.

10. A method as claimed in claim 4 comprising conducting argon through said vapor-deposition apparatus as said inert gas.

11. A method as claimed in claim 4 comprising introducing said inert gas at a temperature in a range between 0°C and 100°C.

12. A method as claimed in claim 11 comprising introducing said inert gas at approximately room temperature.

13. A method as claimed in claim 1 comprising cooling said substrate during said vapor deposition.

14. A method as claimed in claim 13 comprising maintaining said substrate at a temperature in a range between 50°C and 200°C.

15. A method as claimed in claim 1 comprising conducting said vapor-deposition at a rate greater than 1 mg $cm^{-2}min^{-1}$.